

INDIAN DRAGONFLIES.

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Part XXXVIII.

(With two plates and a text-figure).

(Continued from page 76 of Volume XXXV).

Sub-family : PLATYSTICTINÆ. (Continued).

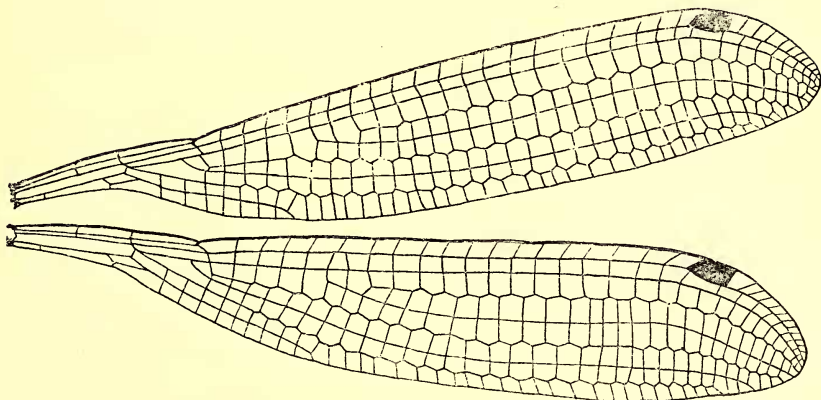


FIG. 1. Wings of *Platysticta deccanensis*, Laid.

Genus : PLATYSTICTA Selys (1860).

*Platysticta* Selys, Bull. Acad. Belg. (2), x. p. 436 (1860); Id. (Subgenus *Platysticta*, 1st group) Mem. Cour. xxxviii, p. 150 (1886); Id. Syn. Agr. sep. pp. 5, 6, 8 and 9 (1860); Kirby, Cat. Odon. p. 132 (1890); Laid. Rec. Ind. Mus. vol. xiii, pp. 339, 340 (1917); Id. *Spolia Zeylanica*, vol. xii, p. 360 (1924); Fraser, Legion *Platysticta*, Rec. Ind. Mus. vol. xxvi, p. 498 (1924); Laid. Journ. Malay branch, Roy. Asia. Soc. vii. pp. 303-304 (1924).

Dragonflies of slender build with the characteristics of the sub-family, of rather larger stature than the Protostictas but resembling them closely otherwise. Body-colouring non-metallic, black, brown or bright brick-red marked with azure blue. Wings closed when at rest, long narrow, falcate at apex, with a long petiole, hyaline or opaque at apices; discoidal cell elongate, costal border about four times as long as the proximal and slightly longer than the posterior; sectors of arc arising at lower part of arc *but diverging from origin*; an accessory basalpostcostal nervure always present near base of wing in addition to the nervure *Ac* which is situated about midway between the two

antennodal nervures; *Ab* always present but incomplete, meeting *Ac* at or well away from the posterior margin of wing and extending to the posterior side of discoidal cell which it meets at a point near its middle; *IA* absent; *Cu<sub>1</sub>* of about 6 to 9 cells in length; *MA* and *IR<sub>iii</sub>* zigzagged almost from origins; *Riv + v* arising a short distance proximad to the oblique nervure descending from the subnode, *IR<sub>iii</sub>* slightly proximad to the level of the subnode; pterostigma subquadrate, costal side shorter than posterior which is somewhat convex, inner border oblique, unbraced, outer straight; cells of wings mainly pentagonal.

Head, thorax and abdomen similar to *Protosticta* but the latter less than double the length of wings; anal appendages variable, superiors forcipate, spatulate at apices; inferiors usually shorter than superiors, broad at base, tapering to the apex which is acute or obtuse, directed straight back or curled inwards towards its fellow. Genitalia,—hamules broad quadrate plates, penis with apex curled strongly over dorsum and its branches long, curled and embracing the stem of organ; a crest or ruff on the dorsum which simulates a spine as viewed in profile; lobe flask-shaped. Vulvar scales very robust, minutely spined below, usually extending beyond end of abdomen. Larvæ unknown. Genotype.—*Platysticta maculata* Selys.

*Distribution*.—South India and Ceylon only. Three species only are included in this genus from within our limits and it is doubtful if other species outside of this area can be strictly classed as congeneric to *P. maculata*. Two species are from Ceylon, the third from Cochin in South India. The genus as defined here includes only those species which fall within the Selysian subgenus *Platysticta*, group 1. Like *Protosticta*, species of the genus are to be found along the banks of montane streams clinging to mosses and ferns overhanging shady spots.

#### Key to the species of genus *Platysticta*.

- |    |   |                                 |     |     |                             |
|----|---|---------------------------------|-----|-----|-----------------------------|
| 1. | { | Wings of male tipped with black | ... | ... | <i>P. apicalis</i> Kirby.   |
|    |   | Wings hyaline throughout        | ... | ... | 2.                          |
| 2. | { | Thorax uniform brick-red        | ... | ... | <i>P. deccanensis</i> Laid. |
|    |   | Thorax black marked with blue   | ... | ... | <i>P. maculata</i> Selys.   |

The authorship of species *P. maculata* and *C. hilaris* has been shown as Selys, since Hagen's papers published in the *Verhandlungen der k.-k. zool-bot Gesellschaft Wien*, vols. viii and ix of 1858 and 1859 respectively gave only a list of names without descriptions. The descriptions of these two species were published later by Selys who adopted Dr. Hagen's names. It is even possible that the descriptions were communicated to Selys by Hagen as in the case of many others.

#### *Platysticta maculata* Selys.

*Disparoneura maculata* Hagen, *Verhandl. zool.-bott-Gesell. Wien*. vol. ix. p. 206 (1859).

*Platysticta maculata* Selys, *Bull. Acad. Belg.* (2) x. p. 437 (1860); *Id. Rev. Syn. Agr. sep.* p. 151 (1886); Kirby, *Cat. Odon.* p. 132 (1890); *Id. Journ. Linn. Soc. (Zool)* xxiv. p. 561 (1893); Laid. *Rec. Ind. Mus.* vol. xiii, p. 341 (1917); *Id. ibid.* vol. xi, p. 387 (1915); *Id. Spolia Zeylanica*, vol. xii, p. 361 (1924).

*Platysticta greeni* Kirby, *Proc. Zool. Soc. Lond.* p. 204, pl. xx. figs 3, 3a (1891).

Male. Abdomen 47–48 mm. Hindwing 31–33 mm.

Head velvety black; labium brown paling to dirty white at base; labrum glossy black, pale azure blue for its basal half; anteclypeus pale azure blue as also bases of mandibles adjacent to it; postclypeus and rest of head unmarked; eyes black above, dark olivaceous brown below.

Prothorax black, its sides low down palest blue.

Thorax velvety black on dorsum as far lateral as the anterior border of metepimeron and traversed on each side midway between the humeral and postero-lateral sutures by a narrow pale blue oblique stripe. The hinder three-fourths of metepimeron palest blue changing to creamy white beneath thorax.

Legs brown, trochanters and coxæ creamy white, the base and flexor surface of femora pale, spines pale golden yellow.

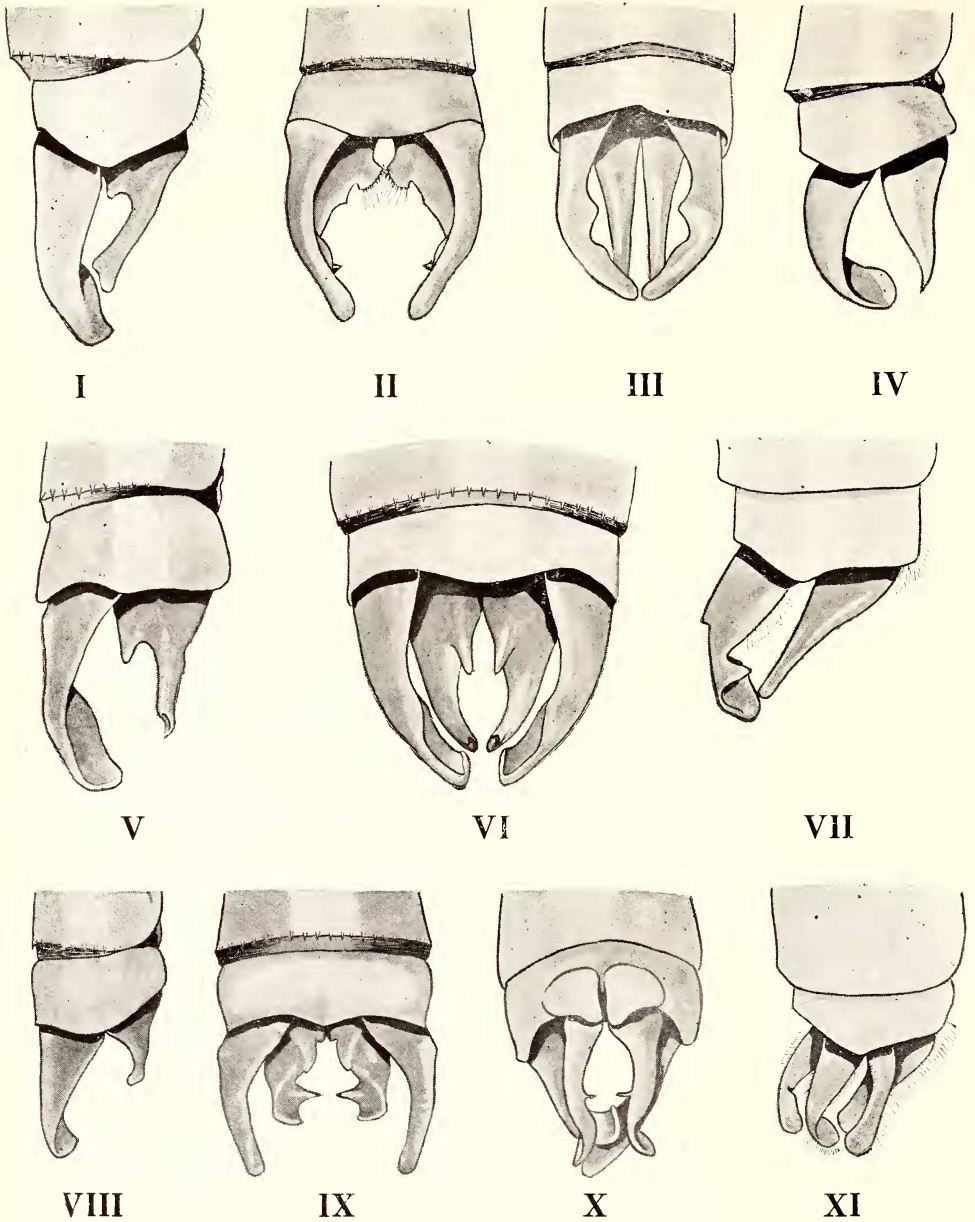


Plate I.

- I. Anal appendages of *Ceylonosticta tropica* (Selys), seen from the right side.
  - II. The same, dorsal view.
  - III. Anal appendages of *Platysticta deccanensis* Laid., dorsal view.
  - IV. The same of *Drepanosticta annandalei* Fras., seen from the right side.
  - V. Anal appendages of *Platysticta apicalis* Kirby, seen from the right side.
  - VI. The same, dorsal view.
  - VII. Anal appendages of *Platysticta deccanensis* Laid., seen from the right side.
  - VIII. The same of *Ceylonosticta digna* (Selys), seen from the right side.
  - IX. The same, dorsal view.
  - X. The same of *Drepanosticta viridis* Fras., ventral view.
  - XI. The same of *Ceylonosticta montana* (Selys), right dorso-lateral view.
- (Camera lucida studies, all drawn to the same scale.)

Wings hyaline palely tinted with yellow; pterostigma subquadrate but slightly longer than broad, inner border very oblique, outer slightly convex, costal border four-fifths the length of posterior, dark reddish brown framed finely in yellow and enclosed in thick black nervures; 20-25 postnodal nervures in forewings, 19 in the hind; *ac* and *ab* meeting the posterior border of wing at a common point, *ab* meeting discoidal cell nearer its base than outer end.

Abdomen black above, yellow along the ventral border and below, the sides of segments 1 and 2 and base of 3 pale yellow, this colour forming basal annules interrupted on the dorsum on segments 3 to 7. Segments 8 to 10 azure blue on dorsum, this colour broad at apical end of segment 8 and tapering to a fine point on the middorsum just short of the base of segment; segment 10 black at sides.

Anal appendages black, paler at apices; superiors nearly twice the length of segment 10 which is very short; seen from above these appendages are forcipated curling gently inwards at apices, broad at base then tapered at the middle, again abruptly dilated on the inner side, from which point as far as apex they are of even width and spatulate (The whole appendage viewed from above resembles a Krop razor with its blade nearly fully opened). Inferior appendages rather more than half the length the superiors, very broad at base, tapering rapidly to an obtuse point, the apical fourth angulated inward; a small subbasal tubercle on the inner side.

Female. Abdomen 36 mm. Hindwing 29 mm.

Closely similar to the male save for sexual characters. Prothorax with two curious bosses on the dorsum of middle lobe; segments 8 and 9 blackish brown on dorsum, unmarked with blue; segment 10 with a large spot of blue on the middorsum, its apical border ridged. Vulvar scales robust, extending beyond end of abdomen, minutely spined below; anal appendages short, pointed at apex, conical, as long as segment 10.

*Distribution*.—Confined to the hilly tracts of Ceylon at elevations of 3,000 to 4,000 ft. Rhambodda, Punduloya, Urugalla during April and May.

In the British Museum collection there are no less than three species included under the head of *P. maculata* but I do not think that there is much doubt as to which of these is the actual species under discussion. The description given here is from specimens collected by Col. F. Wall at Urugalla and compares so closely with the original description that there can be no doubt as to the correct identification of Col. Wall's specimens.

#### *Platysticta apicalis* Kirby.

*Platysticta apicalis* Kirby, Journ. Linn. Soc. (Zool). xxiv. pp. 561, 562 Pl. xlii, fig. 1. (1893); Laid. Rec. Ind. Mus. vol. xiii, p. 311 (1917); Id. Ibid. vol. xi p. 387 (1915); Id. *Spolia zeylanica*. vol. xii. p. 361 (1924).

Male. Abdomen 48 mm. Hindwing 34 mm.

Head velvety black with a steely blue reflex; labium pale brown; labrum, bases of mandibles, ante- and post-clypeus azure blue, rest of head unmarked. Eyes black above, dark brown below.

Prothorax azure blue, posterior lobe black.

Thorax steely black with a blue reflex, marked on each side with a narrow oblique azure blue stripe on the mesepimeron. Beneath and along lower border of metepimeron pale yellow.

Legs black, coxæ, trochanters and bases of all femora pale yellow. Wings hyaline with the apices of all blackish brown as far proximad as the inner end of pterostigma which structure is twice as long as broad, inner end oblique, outer end angulated or convex, covering one or two cells, dark blackish brown; 19 postnodal nervures in forewings, 18 in the hind; *ac* very oblique and meeting *ab* very near the posterior margin of wings; other features of venation as for the genus.

Abdomen black on dorsum, yellow low down on the sides and beneath except for the last few segments. Segments 8 to 10 azure blue on dorsum, but the base of the former segment narrowly black which projects into the blue along the middorsal carina as a tapering point.

Anal appendages black; superiors two and a half times as long as segment 10 which is very short, broad at base, then tapered as far as the middle where it again dilates as a compressed spatulate apex somewhat squared at the end.

Seen in profile, the appendage is convex dorsally and rather strongly curved at its middle. Inferiors about four-fifths the length of superiors, very broad at base, then tapered as far as apex which ends in an acute abruptly turned-up point; a very robust spine projecting back from the dorsum near its base.

Female. Abdomen 42 mm. Hindwing 36 mm.

Closely similar to the male except for sexual characters, differing only by its wings which are tipped with yellow instead of blackish brown, and by the terminal abdominal segments the 8th being entirely black, 9 with a small greenish blue or yellow spot on each side and 10 with its dorsum greenish blue or yellow. Anal appendages conical, pointed at apex, as long as segment 10. Vulvar scales robust, extending to end of abdomen.

*Distribution*.—Ceylon only, confined to the montane tracts. Belihul-Oya during June, and Madulsima where Mr. Bainbrigge Fletcher took a few specimens during August. It is probably on the wing from June to August or September. The species is probably very local and has only been taken in the years 1892 and 1908; it should not be difficult for Ceylon entomologists to rediscover this beautiful insect and give us some account of its habits.

#### *Platysticta deccanensis* Laidlaw.

*Platysticta deccanensis* Laid. Rec. Ind. Mus. vol. xi, p. 388, text-fig-1. (1915); Id. *ibid.* vol. xiii, pp. 340, 341, Pl. xv. fig. 4. (1917); Fras. Id. vol. xxvi. pp. 498, 499 (1924).

Male. Abdomen 45-47 mm. Hindwing 31-32 mm.

Head.—Labium yellowish; labrum and anteclypeus azure blue, the former narrowly bordered with black; postclypeus azure blue bordered above with black; rest of head matt black; 3rd joint of antennæ brownish at its distal end; eyes black above, olivaceous brown below:

Prothorax dark reddish brown above paling to light red at the side and yellowish beneath.

Thorax bright brick-red changing to golden yellow low down on the sides and pale yellow beneath. Middorsal carina and antealar sinus narrowly marked out in black.

Legs reddish brown, femora at proximal ends and coxæ and trochanters golden yellow.

Wings palely enfumed, hyaline; pterostigma dark red framed finely in light yellow and heavy black nervures, not quite twice as long as broad, inner end pointed, outer border straight, costal border shorter than posterior, covering 1 to 2 cells; *ac* meeting *ab* at the posterior margin of wing or a short stalk intervening, *ab* short and often sinuous; 17 to 21 postnodal nervures to forewings, 17-19 in the hind.

Abdomen dark reddish brown paling to golden yellow beneath at bases of segments 2 to 6; segments 8 to 9 azure blue but segment 8 has a narrow black basal annule and both it and 9 are bordered below with black; segment 10 blackish brown, very narrow.

Anal appendages black, subforcipate as seen from above; superiors broad at base constricted at about the middle where a robust obtuse spine is seen on the inner side, then broadened and somewhat spatulate for the apical half which is curled down and in and hollowed out; inferiors nearly as long as superiors, broad at base then tapered as far as apex which ends in an obtuse point turned slightly inward.

Female. Abdomen 36-40 mm. Hindwing 28-29 mm.

Differs rather widely from the male, far more so than is usual in the subfamily; head similar to male; prothorax coloured similarly, the posterior lobe very broad, rounded.

Thorax brick-red, the middorsal carina and antealar sinus mapped out in black, the dorsum and anterior half of mesepimeron black but the ground colour showing as a fine line against the middorsal carina and upper humeral region, the humeral suture being finely delineated in reddish and the upper and lower part of mesepimeron more broadly so. Traversing the black of dorsum is a narrow antehumeral pale blue stripe convex inwards and not extending to upper part of thorax; bordering the black area of mesepimeron, another similar blue stripe (a beautiful ensemble of colours); beneath as for male.

Legs and abdomen similar to male but segment 1 bright brick-red at the sides, segment 8 unmarked with blue, segment 9 with a large oval pale blue

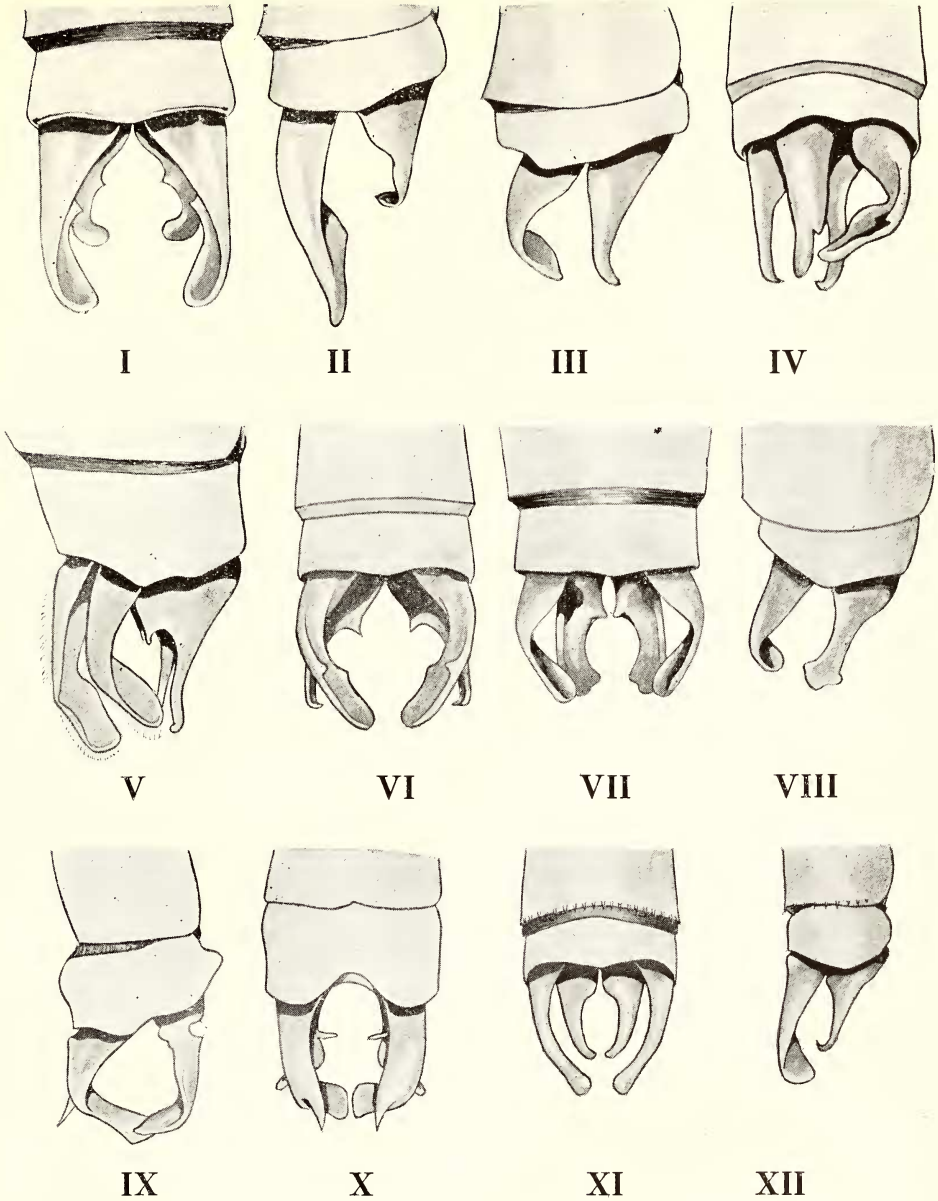


Plate II.

- I. Anal appendages of *Platysticta maculata* Selys, dorsal view.
- II. The same, seen from the right side.
- III. Anal appendages of *Drepanosticta carmichaeli* Laid., seen from the right side.
- IV. The same, dorso-lateral view.
- V. Anal appendages of *Ceylonosticta hilaris* (Selys.), seen from the right side.
- VI. The same, dorsal view.
- VII. Anal appendages of *Ceylonosticta nietneri* sp. nov., dorsal view.
- VIII. The same, seen from the right side.
- IX. Anal appendages of *Drepanosticta viridis* (Fras), dorsal view.
- X. The same, seen from the right side.
- XI. *Ceylonosticta lankanensis* sp. nov., anal appendages dorsal view.
- XII. The same, seen from the right side.

Camera lucida studies, all drawn to the same scale.

lateral spot. Segments 7 to 10 are blacker than in the male, segment 8 only about one-fourth the length of seven, segment 9 nearly twice the length of 8, and segment 10 very short as in the male.

Anal appendages short, not longer than segment 10, reddish brown, pointed, conical. Vulvar scale very long and robust, extending well beyond end of abdomen and with a robust spine above the end.

Wings usually more deeply enfumed than in the male, pterostigma of similar shape but more blackish than reddish brown; 20 postnodal nervures in forewings, 17 in the hind.

*Distribution*.—Confined so far as known to Cochin, South India. The type is in the Indian Museum and was taken at Kavalai, Cochin State on 24-27. ix. 14. Wishing to obtain more of these interesting and beautiful insects and to study their habits, I revisited Kavalai in September, 1928, and took 17 males and 4 females at the same stream as the types came from. Most were found resting on maidenhair fern in dark shady spots, a number being seen in a culvert running beneath the forest railway. The red thorax and the blue identification marks, especially the latter, were very conspicuous. The flight of the insect is short and weak. Although very local, it was by no means uncommon and I suspect this to be the case with *P. apicalis* its near relation. The colouring of the female with its blue striped thorax is nothing less than remarkable and without parallel in an order where, if the female differs from the male, it is usually on the side of duller and less conspicuous colouring. It would suggest a more primitive insect in which both sexes were black with blue antehumeral and lateral stripes as is the case with *Indoneuras*, the male having subsequently lost these markings in favour of heliochromatic tints.

#### CEYLONOSTICTA gen. nov.

*Platysticta* 2me groupe Selys, Syn. Agr. Derniere Legion, sep. p. 9 (1860).

Dragonflies of smaller size than the last genus but with similar habits and characters. Body-colouring black and brown with blue markings. Wings closed when at rest, long, narrow, falcate at apex, with a long petiole, hyaline, never opaque; discoidal cell shaped as in *Platysticta*; sectors of arc arising from lower part of arc but fused for a short distance from origin; an accessory basal postcostal nervure present near the base of wings in addition to the nervure *Ac* which is situated rather nearer the distal antenodal nervure; *Ab* always present but incomplete, meeting *Ac* at or a little away from the posterior margin of wing and extending to the posterior side of the discoidal cell which it meets at a point near its proximal end; *IA* absent; *Cuii* of about 6 to 8 cells in length; *MA* and *IRiii* not zigzagged at origins; *Riv* + *v* arising a short distance proximad to, at or slightly distad of the oblique nervure descending from the subnode, *IRiii* at or slightly distad the level of subnode; pterostigma similar to genus *Platysticta*; cells of wings mainly quadrangular.

Head, thorax and abdomen similar to *Protosticta* but the latter less than double the length of wings; anal appendages variable, superiors usually somewhat forcipate and spatulate at apices; inferiors tapering from base to apex or more widely variable in the species. Genitalia of both sexes very similar to genus *Platysticta*.

Larvæ unknown. Genotype.—*Ceylonosticta hilaris* (Selys).

*Distribution*.—Confined to Ceylon in montane and submontane tracts. Habits similar to those of *Platysticta* so far as known. The original descriptions are poor so that without the actual types before one, it has been difficult or impossible to accurately determine the available material. Four species were originally described by Selys but a fifth has been described since by Dr. Laidlaw under the heading of *Drepanosticta* sp. which he surmises however, and I think with good reason, may be conspecific with *P. hilaris* Selys. Another pair, also described as *Drepanosticta* sp., but presumably differing from the above, was said by the same author, to be too damaged to identify. I have also found some difficulty in determining some material before me, collected by Col. F. Wall, I.M.S., several species of which do not compare exactly with the Selysian descriptions. Thus it is certain that more species remain to be described and three of such have been named below. Further material is greatly to be desired and it is hoped that Ceylon entomologists will assist us in elucidating this problem.

Key to species of genus *Ceylonosticta*.

- |    |   |  |                                |
|----|---|--|--------------------------------|
| 1. | { | Moderately large species with abdomen more than 40 mm. in length ... ..  | 2                              |
|    |   | Smaller species with abdomen less than 40 mm. in length ... ..   | 4                              |
| 2. | { | Anterior lobe of prothorax prolonged forward as two stalked process ... ..   | <i>C. tropica</i> (Selys.)     |
|    |   | Anterior lobe of prothorax simple ... ..   | 3                              |
| 3. | { | Inferior anal appendages acutely pointed; labrum bordered with black .. ..   | <i>C. hilaris</i> (Selys.)     |
|    |   | Inferior anal appendages obtuse at apex; labrum not bordered with black ... ..   | <i>C. montana</i> ,,           |
| 4. | { | Inferior anal appendages viewed dorsally squared at apex and with a very robust subapical spine directed inwards to meet its fellow across the middle line ... ..                    | <i>C. digna</i> ,,             |
|    |   | Inferior anal appendages simple, without subapical spine ... ..  | 5                              |
| 5. | { | Very small species with abdomen less than 30 mm. in length; labrum finely bordered with black; inferior anal appendages acuminate at apex; posterior lobe of prothorax simple ... .. | <i>C. lankanensis</i> sp. nov. |
|    |   | Very small species with abdomen less than 30 mm. in length; labrum broadly bordered with black; posterior lobe of prothorax prolonged into a long tapering point ... ..              | <i>C. walli</i> sp. nov.       |
|    |   | Larger species with abdomen more than 30 mm in length; inferior anal appendages trilobate at apex ... ..   | <i>C. nietneri</i> ,,          |

*Ceylonosticta hilaris* (Selys).

*Agrion hilare* Hagen, Verhand. zool-bot-Gesell. Wien, vol. viii, p. 479 (1858). Name only given.

*Disparoneura hilaris* Id. *ibid.* vol. ix, p. 206 (1859). Name only given.

*Platysticta hilaris* Selys, Bull. Acad. Belg. (2) x. p. 438 (1860); Id. Syn. Agr. sep. pp. 11 and 12 (1860); Id. Rev. Syn. Agr. sep. p. 151 (1886); Id. Mem. Cour. xxxviii, p. 152 (1886); Kirby, Cat. Odon. p. 132 (1890); Id. Journ. Linn. Soc. Zool. vol. xxiv, p. 562 (1893); Laid. Rec. Ind. Mus. vol. xi, p. 387 (1915).

*Drepanosticta hilaris* Laid. *Spolia Zeylanica*, Vol. xii, pp. 362, 364 (1924).

*Drepanosticta* sp. Laid. 1. c. Vol. xii, pp. 362-364 (1924).

Male. Abdomen 42 mm. Hindwing 25 mm.

Head.—Labium brown; labrum pale turquoise blue narrowly bordered with glossy black; bases of mandibles glossy black, the extreme base only blue; anteclypeus turquoise blue; postclypeus glossy black, rest of head bronzed black with a large patch of obscure reddish brown partially encircling the ocelli behind and on each side; eyes black above, olivaceous brown beneath; occiput with a projecting scale like ledge pointed at either end overlapping anterior lobe of prothorax.

Prothorax bronzed brown on dorsum, paler brown laterally; anterior lobe sloping forward encircling the neck like a stiff collar; middle lobe with a deep central pit situated between two prominent rounded bosses; posterior lobe simple rounded, the posterior border straight or very shallowly concave.

Thorax bronzed black or deep coppery brown on dorsum changing to reddish brown and then ochreous on the sides and beneath. A narrow oblique azure blue stripe on each side traversing the centre of mesepimeron, after which is a thin black line on the postero-lateral suture. (In the original description the blue stripe is omitted probably because decomposition had obscured it.)

Wings hyaline, enfumed and tinted palely with yellow; pterostigma reddish brown finely framed in yellow and thick brown nervures, rather longer than broad, inner side a little oblique, outer nearly straight; 15-16 postnodal nervures in forewings, 14-15 in the hind; *Riv+V* arising slightly distad or in



continuation of the oblique nervure descending from the subnode; *ab* meeting near the hinder border of wings.

Legs yellow or olivaceous, outer surfaces of femora and articulations blackish.

Abdomen dark reddish brown deepening to bronzed black at ends of segments; sides of segments 1 and 2 paler; segments 3 to 7 with moderately broad basal annules; segment 8 with its apical border broadly and the whole of segments 9 and 10 azure blue, reddish brown below and along ventral borders.

Anal appendages blackish brown; superiors more than twice the length of segment 10, broad at base then tapering and curving down in the apical half which is broadened out, excavated on its inner side and squared at the apex. A small dorsal spine situated at the point where the appendage begins to broaden out. Inferior appendage slightly shorter than superiors, very broad at base where is situated a robust dorsal spine, then slender and tapering to an acute point at apex.

Female. Abdomen 36-37 mm. Hindwing 26-27 mm.

Closely similar to the male in colouring and markings,—differs as follows:—border of labrum less broadly bordered with black and the black border itself bordered with reddish brown; legs yellow, articulations only blackish. Wings more deeply enfumed; 15-17 post-nodal nervures to forewings, 14-15 in the hind; *Riv+v* arising proximal to the oblique nervure descending from the subnode. Abdomen similar but the basal annules pale blue in old specimens, yellow in others and tenerals; segment 8 unmarked with blue, 9 with only a small subdorsal oval spot near the apical border of each side of segment, 10 with a large dorsal spot.

Anal appendages reddish brown, conical, pointed at apex, barely as long as segment 10; vulvar scale robust, extending well beyond end of abdomen.

*Distribution*.—Ceylon only. Rhambodda Ghat, Kandy and other montane areas from May to September. The figure given of the anal appendages by Dr. Laidlaw for his *Drepanosticta* sp., is sufficient proof that this species is *C. hilaris* as he surmised. Post-mortem decomposition accounts for the differences to be noted between the above and the Selysian description. From *C. digna*, this species is easily distinguished by the shape of its inferior appendages; from *C. tropica* by the simple collar-like anterior lobe of prothorax; from *C. montana* by the labrum bordered with black and by the inferior appendages ending in an acute point; from the remaining species by its much larger size and more numerous postnodal nervures.

#### *Ceylonosticta montana* (Selys.)

*Platysticta montana* Selys, Bull. Acad. Belg. (2) x, p. 438 (1860); Id. Syn. Agr. sep. pp. 10-11 (1860); Id. Mem. Cour. Rev. Syn. Agr. p. 151 (1886); Kirby, Cat. Odon. p. 132 (1890); Id. Journ. Linn. Soc. Zool. vol. xxiv, p. 363 (1893); Laid. Rec. Ind. Mus. vol. xi, p. 387 (1915).

*Drepanosticta montana* Laid. *Spolia zeylanica*. vol. xii, p. 362 (1924).

Male. Abdomen 43 mm. Hindwing 28 mm.

Head—Labium dark brown; labrum turquoise blue narrowly bordered with reddish brown; bases of mandibles and anteclypeus turquoise blue; postclypeus glossy black, rest of head bronzed black with a broad patch of reddish brown encircling the ocelli on either side and behind; eyes black above, olivaceous brown beneath.

Prothorax bronzed brown on dorsum, paler reddish brown laterally; anterior lobe collar-like; posterior lobe simple, rounded.

Thorax bronzed black on dorsum changing to reddish brown on the sides and yellowish beneath. (Probably an oblique blue stripe on the middle of mesepimeron but obscured by decomposition in the type.)

Legs yellowish, the outer surface of femora and articulations blackish.

Wings hyaline, palely enfumed; pterostigma slightly longer than broad, similar in shape to that of *C. hilaris*; 16-18 postnodal nervures in forewings, 15-16 in the hind; *Riv+v* arising a little distad of the oblique nervure descending from the subnode.

Abdomen bronzed brown on dorsum deepening to black at the distal ends of segments; segments 3 to 7 with moderately broad basal annules; segment

8 unmarked (so far as can be seen in the type, but probably its apical border bluish during life); segments 9 and 10 azure blue on the dorsum. (In the type, segment 9 brown from decomposition.)

Anal appendages blackish brown, superiors more than twice the length of segment 10, broad at base then tapered as far as the middle, at which point they are dilated internally and curved rather strongly downward and furnished with a small obtuse spine at the point of the angulation on the upper inner border of appendages; the dilated part of even width, excavate on the inner side and ending in a squared apex directed somewhat inward and downward. Inferiors slightly shorter than superiors, broad at base, then tapered and slim as far as apex which is again broadened and curved inward towards its fellow; a robust tooth on the upper inner border near the base.

Female. Abdomen 37 mm. Hindwing 26 mm.

Closely similar to the male, differing only in sexual characters and by the markings on the terminal segments of abdomen. A small subdorsal subapical spot of blue on each side of segment 9, and a broad dorsal spot of the same colour on segment 10. Anal appendages as long as segment 10 which is very short and without an apical notch, conical, pointed at apex, brown. Vulvar scale very robust, extending well beyond end of abdomen.

*Distribution*.—Ceylon only, in montane tracts, Rhambodda Ghat and Kandy. Differs from *C. tropica* by the simple shape of the lobes of prothorax; from *C. hilaris*, to which it is very closely related, by the tumid end of inferior appendages and by the labrum unbordered with black; from *C. digna* by the absence of a middle inner spine on inferior appendages. From the remaining species by its much larger size.

#### *Ceylonosticta tropica* (Selys.)

*Platysticta tropica* Selys. Bull. Acad. Belg. (2). x. p. 438 (1860); Id. Syn Agr. sep. p. 10 (1860); Id. Mem. Cour. Rev. Syn. Agr. p. 151 (1886); Kirby, Cat. Odon. p. 132 (1890); Id. Journ. Linn. Soc. Zool. vol. xxiv. p. 562 (1898); Laid. Rec. Ind. Mus. vol. xi. p. 387 (1915); Id. Ibid. vol. xiii. p. 341 (1917).

*Drepanosticta tropica* Laid. Spolia Zeylanica. vol. xii. p. 362 (1914).

Male Abdomen 41 mm. Hindwing 26 mm.

Head—Labium pale brown; labrum, bases of mandibles and anteclypeus pale turquoise blue, the former narrowly bordered with brown; postclypeus bronzed brown above, rest of head bronzed black with a small obscure yellow oval spot on the outer side of each outer ocellus; eyes black above, olivaceous brown beneath; 2nd and 3rd segments of antennæ pale yellowish.

Prothorax pale olivaceous brown, the middle lobe possibly bluish during life; posterior lobe bronzed black, arched, rounded; anterior lobe with a deep and wide cleft at its middle, the lobe on each side of this prolonged into a curious stalked scale resembling those seen on the posterior lobe of some of the *Caconeura* group; between these two scales the lobe prolonged forward as a short blunt process.

Thorax dark bronzed brown or cupreous black on dorsum, the lower part of sides paling to reddish brown and then yellow beneath thorax; a moderately broad oblique azure blue stripe on each side traversing the centre of mesepimeron from above down.

Legs olivaceous, the external and extensor surfaces of femora and the articulations mottled with black.

Wings hyaline palely enfumed; pterostigma blackish brown finely framed in creamy white and again by thick black nervures, half as long again as broad, costal border shorter than posterior, distal border straight, proximal very oblique, braced; *Riv+v* arising slightly before the oblique nervure descending from the subnode; 16-17 postnodal nervures to forewings, 14-16 in the hind; *ab* meeting *ac* at a short distance from posterior margin of wing.

Abdomen bronzed brown deepening to black at apical ends of segments and with narrow basal annules on segments 3 to 7; segment 1 yellow laterally; segments 2 to 4 yellow along the ventral borders; segments 9 and 10 azure blue on the dorsum, the latter narrowly black at the apex.

Anal appendages blackish brown; superiors more than twice as long as segment 10; seen from above curving gently inward towards one another; broad at base then tapered to apex which is obtuse, the apical half presenting

a spatulate-like dilation on the inner border which is hollowed out on its inner aspect. Inferior appendages rather more than half as long as superiors, very broad at base where is seen an inner tubercle which, viewed from above, is broad and coated with numerous stiff bristles. The apical three-fourths slim, sloping up and back and ending in an obtuse shallowly-notched apex as viewed in profile, or as an acutely-pointed, inwardly directed spine as viewed from above.

Female. Abdomen 40 mm. Hindwing 29 mm.

Closely similar to the male in colour and markings but rather more robustly built. Labium dark brown; labrum entirely blue; prothorax with similar scale-like processes on anterior lobe; wings more deeply enfumed; 16 to 17 postnodal nervures to forewings, 16 in the hind; other details of venation similar to the male. No trace of blue to be seen on the terminal abdominal segments but these may be obscured by post-mortem decomposition, and during life are probably present as subdorsal spot on the sides of segment 9 and a large dorsal spot on segment 10. Anal appendages short, barely as long as segment 10, conical pointed, brown; segment 9 about one-third longer than 8 and more than twice the length of 10. Vulvar scales moderately robust, blackish brown, *not extending to end of abdomen*.

*Distribution*.—Confined to the montane tracts of Ceylon. Passara, Haycock Hill, May to August. Hakgala, March and April. The description of the female which has not hitherto been published, is from a specimen in the author's collection from Hakgala.

There is no possibility of confusing this species with any other as the curious prothoracic processes are unique in the genus and are sufficient to determine the species at a glance. It is of interest to note that these accessory sexual appendages are found in both sexes.

#### *Ceylonosticta digna* (Selys.)

*Agrion digna* Hagen, Verhandl. Zool-bot. Gesell. Wien, vol. viii. p. 479. (1858).

*Disparoneura digna*, Hagen, Ibid. vol. ix. p. 207 (1859). Name only.

*Platysticta digna*, Selys, Bull. Acad. Belg. (2) vol. x. p. 440 (1860); Id. Syn. Agr. sep. p. 12 (1860); Id. Mem. Cour. Rev. Syn. Agr. xxxviii. p. 151 (1886); Kirby, Cat. Odon. p. 132 (1890); Id. Journ. Linn. Soc. Zool. vol. xxiv. p. 362 (1893); Laid. Rec. Ind. Mus. vol. xi. p. 387 (1915).

*Drepanosticta digna*, Laid. Spolia Zeylanica, vol. xii. pp. 361, 362, text-figure 9 (1924).

Male. Abdomen 35 mm. Hindwing 23 mm.

Head.—Labium pale brown; labrum, bases of mandibles and anteclypeus pale turquoise blue; postclypeus glossy black, rest of head blackish brown; eyes black above, olivaceous brown beneath; 3rd joint of antennæ palest brown. Occiput with the usual scale-like ledge posteriorly.

Prothorax ochreous, possibly blue on the dorsum during life; anterior lobe arched, sloping forward, collar-like; posterior lobe simple, rounded, dark bronzed brown.

Thorax dark bronzed brown on dorsum paling to reddish brown laterally and yellowish beneath; middorsal carina finely blue and an oblique stripe of the same colour traversing the length of mesepimeron midway between the two lateral sutures.

Legs ochreous, outer surface of femora and all articulations blackish brown.

Wings hyaline palely enfumed in adults; pterostigma blackish brown finely framed in yellow and an outer frame of thick black nervures shaped similarly to that of *C. hilaris*; 15-16 postnodal nervures to forewings, 14 in the hind; *Riv+v* arising in prolongation of the oblique nervure descending from the subnode; *ac* and *ab* meeting at a common point on the posterior margin of wing or a short stalk intervening at the junction.

Abdomen blackish brown, segments 2 and 3 at the sides and the bases of 2 to 7 with basal annules yellow; segment 8 black; segments 9 and 10 azure blue above, black along the ventral borders.

Anal appendages blackish brown; superiors more than twice the length of segment 10, broad at base, then tapering somewhat to apex which is obtuse, slightly curved in and down as viewed from above, and the apical half which is

a little expanded on the inner side, markedly excavate. Inferior appendages about two-thirds the length of superiors, of unusual and irregular shape, very broad at base, outer border sinuous as seen from above, inner border deeply serrate, presenting an obtuse basal tubercle followed by a subbasal which is followed successively by a deep notch, a median robust spine and then a final shallow notch; the median spine is directed straight inwards and nearly meets its fellow on the opposite side; the apex squared and slightly bevelled. Seen from the side the appendage tapers rapidly to an obtuse point. Female unknown.

*Distribution*.—Ceylon only in montane tracts. Rhambodda Ghat and Haragama from May to August. The above revised description was made from a specimen in the British Museum. The species is easily determined from all others by the curiously shaped inferior appendages. Type in the Selysian collection.

**Ceylonosticta nietneri** sp. nov.

Male. Abdomen 31-32 mm. Hindwing 20-21 mm.

Head.—Labium pale brown; labrum, bases of mandibles and anteclypeus pale turquoise blue; postclypeus glossy black, rest of head bronzed black; 3rd joint of antennæ pale brown; eyes black above, olivaceous brown beneath; occiput with a similar scale as seen in *C. hilaris*.

Prothorax pale ochreous; posterior lobe except its hinder border and the whole of the dorsum of middle lobe pale blue; anterior lobe collar-like, posterior rounded, simple.

Thorax bright reddish ochreous with a cupreous reflex on dorsum and a broad oblique pale blue stripe on each side situated between the two lateral sutures; pale ochreous beneath.

Legs pale olivaceous, the articulations speckled with black.

Wings hyaline, very palely enfumed; pterostigma blackish brown finely framed in creamy white and thick black nervures, nearly square, but slightly longer than broad, distal side convex, proximal oblique, braced; 14-16 postnodal nervures in forewings, 13-14 in the hind; *ab* meeting *ac* at a short distance from the posterior margin of wing, the former ending very near the proximal end of discoidal cell; origin of *Riv* + *v* at or slightly distad of the oblique nervure descending from the subnode.

Abdomen yellow beneath and on the sides of segment 1, dark enfumed olivaceous on dorsum and sides, deepening to black at apical ends of segments, and on the whole of segment 7 and most of 8; bases of segments 3 to 4 or 5 with incomplete basal annule which extend apicad along the ventral borders of segments; segment 8 blackish brown marked dorsally with an apical triangle of azure blue which extends variably towards base of segment covering from one-fourth to half the segment; segments 9 and 10 entirely blue on dorsum, the ventral borders black.

Anal appendages blackish brown, apices of inferiors paler brown; superiors twice the length of segment 10, simple, arched up and then down, broad and depressed at base, then, at the middle, twisted on the long axis of appendage, the outer half broadened compressed and hollowed out within, *not bearing any spines*; inferior appendages of the same length, broad at base, directed straight back or a little obliquely upward, of even thickness throughout as far as apex which is expanded into three angles like the webbed foot of a duck; *without a basal spine*.

Female. Abdomen 30-31 mm. Hindwing 22 mm.

Closely similar to the male but of stouter build, the abdomen more especially robust. Differs as follows,—Prothorax more prominently marked with blue on middle and posterior lobes, the latter very simple rounded, the scale-like border very narrow and of even width.

Wings with 14 postnodal nervures to forewings, 13 in the hind, otherwise exactly similar to those of male, but *Riv* + *v* always arising distad the oblique nervure descending from the subnode.

Abdomen dark reddish brown, segments 3 to 7 with broad basal azure blue annules interrupted on the middorsum on the latter segment; segment 8 dark reddish brown, the apical articulation only blue; segments 9 and 10 broadly azure blue on dorsum, reddish brown on lower part of sides.

Anal appendages shorter than segment 10, small pointed conical processes, brown. Vulvar scale brown, robust, extending beyond end of abdomen.

*Distribution*.—Ceylon only, Kandy, 2,000 ft. Three males and a single female taken at the latter place by Col. F. Wall, I.M.S., 14. x. 24.

This species and the two following—*C. lankanensis* and *C. walli* are the three smallest species known in the subfamily, not excepting *P. hearseyi* and may be distinguished from all other species at a glance by reason of this feature. The curious shape of the apex of the inferior anal appendages, shaped like a duck's foot, will serve to distinguish it from the other two species mentioned of the same size as itself. The female is to be distinguished by the arched rounded shape of its prothorax, this being produced and strongly angulated in *C. walli*, whilst the female of *lankanensis* is unknown.

*Ceylonosticta lankanensis* sp. nov.

*Platysticta montana* Kirby, Journ. Linn. Soc. Zool. vol. xxiv. p. 562 (1893).

Male. Abdomen 29 mm. Hindwing 20 mm.

Head.—Labium whitish brown: labrum, bases of mandibles and anteclypeus pale turquoise blue, the former very narrowly bordered with black, rest of head blackish brown; eyes dark brown above, olivaceous brown beneath.

Thorax dark reddish ochreous on dorsum and sides but paling to ochreous on metepimeron and yellowish beneath. A broad oblique pale blue stripe on each side lying parallel with and midway between the lateral sutures, contrasting strikingly with the adjacent reddish brown.

Legs olivaceous marked with dark brown on the outer sides of femora and all articulations.

Wings hyaline, palely enfumed; pterostigma blackish brown, finely framed in white and thick black nervures, similar in shape to that of *C. nietneri*; 12-13 postnodal nervures in forewings, 11 to 12 in the hind; *Riv.* + *v* arising in continuation with the oblique nervure descending from the subnode; *ab* meeting *ac* near the posterior margin of wings.

Abdomen reddish brown deepening to black at apical ends of segments; segment 1 yellow laterally; segments 3 to 7 with narrow basal yellow annules; segment 8 with a small apical triangular bordering of blue; segments 9 and 10 azure blue dorsally, black along the ventral borders.

Anal appendages blackish brown, superiors more than twice the length of segment 10, broad at base then tapering as far as the middle, at which point they are dilated, compressed and rotated on their long axis, the apex broad and squared; seen from above these appendages are curved gently towards one another, of almost even breadth throughout and slightly clubbed at apex; inferiors of about two-thirds the length of superiors, very broad at base, then abruptly slim and cylindrical, curved gently in, the extreme apices more abruptly so and ending in a fine point.

Female unknown. Type in the British Museum.

*Distribution*.—Ceylon only, confined probably to montane districts. The type is labelled—'Kottawa, 19. iv. 92,' and is incorrectly determined by the late Mr. Kirby as *P. montana*. This specimen is undoubtedly Col. Yerbury's referred to by Kirby as *P. montana* 'with some doubt' in the J.L.S.1.c. Its small size, the smallest species of the genus, is sufficient to determine it from *P. montana* and several other differential points may be made out with ease. The acutely pointed inferior appendages are sufficient to determine it from *C. nietneri* which has them broad and clubbed at the apices and as long as the superiors. It is possible that the next species described below, is the female of this but the curious shape of the hinder margin of the prothorax in the latter and the extensive black bordering of the labrum appear to place it as an entirely distinct species.

*Ceylonosticta walli* sp. nov.

Female. Abdomen 31 mm. Hindwing 22 mm. (Male unknown.)

Head.—Labium blackish brown; labrum pale turquoise blue broadly bordered with glossy black; bases of mandibles black with a spot of blue at the extreme base; anteclypeus pale turquoise blue, postclypeus and rest of head black bronzed; eyes black above, olivaceous brown beneath: distal end of 3rd segment of antennæ pale brown.

Prothorax with middle lobe pale blue, anterior and posterior lobes reddish

brown, the former collar-shaped, the latter with the medial portion of its thinned-out border prolonged into a long tapering point.

Thorax reddish ochreous deepening to dark bronzed brown on dorsum, paling on lower part of metepimeron and beneath; a moderately broad azure blue stripe traversing the whole length of mesepimeron midway between the lateral sutures.

Legs olivaceous, articulations blackish, outer surfaces of femora and whole of tibiae enfumed brown.

Wings hyaline, palely enfumed; pterostigma nearly quadrate especially in the forewings, inner end slightly oblique, outer slightly convex, dark reddish brown framed finely in white and thick black nervures; 15 postnodal nervures in forewings, 14 in the hind; *Riv + v* opposite or a little distad of the oblique nervure descending from the subnode; *ac* and *ab* arising from different points on the posterior border of wings (in the type the nervure *ab* is absent in the right pair of wings).

Abdomen reddish brown changing to blackish brown at distal ends of segments; segments 2 to 7 with azure blue basal annules, very narrow on segment 2, broad on 4 to 6; segment 8 unmarked; segments 9 and 10 with the dorsum azure blue, the ventral borders dark blackish brown.

Anal appendages reddish brown, slightly longer than segment 10, conical, acute at apex; vulvar scale robust, extending beyond end of abdomen.

*Distribution*.—Ceylon only, confined to montane tracts. Type, a female, in the author's collection, taken at Kandy, 2,000 ft., 13. ix, 24 by Col. F. Wall, I.M.S. Differs from the female of *C. neilneri* by the posterior lobe of prothorax which is prolonged into a long tongue-like point and also by the labrum broadly bordered with black, by the higher nodal index, etc. From the male of *C. lankanensis* it also differs by the shape of the posterior lobe of prothorax, by the labrum broadly bordered with black, by the broader basal blue annules of the abdomen and by the different origin of *ab*, etc.

#### Genus: DREPANOSTICTA Laidlaw (1917).

*Platysticta* Selys. *pars*. Bull. Acad. Belg. (2) x. p. 436 (1860); Id. Mem. Cour. xxxviii, p. 150 (1886); Kirby, Cat. Odon. p. 132 (1890); Laid. Rec. Ind. Mus, Vol. xi, pp. 378, 379 (1915).

*Drepanosticta* Laid. *ibid.* vol. xiii, pp. 339, 341 (1917); Id. Journ. Malay branch Roy. Asia. Soc. vol. ii, pp. 304-306 (1924).

Dragonflies of the same small size as the last genus and with similar habits and characteristics. Body-colouring usually black, but in one species at least, reddish brown marked with blue. Wings closed when at rest, long, narrow, falcate at apex, with a long petiole, hyaline; discoidal cell shaped as in *Platysticta*; sectors of arc arising from lower part of arc *but fused for a short distance from origin*; an accessory basal postcostal nervure present near base of all wings in addition to the nervure *ac*, which is situated rather nearer distal antenodal nervure, *ab* usually present *but sometimes absent* and, when present, always incomplete, meeting *ac* at or near the hinder margin of wing or arising from that margin at some point more or less distad of *ac* and extending to the posterior border of discoidal cell near its proximal end; *IA* absent; *Cuiv* of variable length, usually 6 to 8 cells in length; *MA* and *IRiii* not zigzagged at origins; *Riv + v* arising slightly before, at or slightly distad the oblique nervure descending from the subnode; *IRiii* at or a little distad of that nervure; pterostigma subquadrate, costal side slightly shorter than the posterior, inner end oblique, unbraced, outer slightly convex. Cells of wings mainly quadrangular.

Head, thorax and abdomen similar to *Protosticta* but the abdomen less than twice the length of wings except in *D. viridis*; anal appendages variable, superiors subforcipate, spatulate in the apical half which is curved down and usually carries a robust dorsal spine at the middle; inferiors variable, with or without a long inner narrow spine; genitalia similar to that of *Protosticta*, *penis without a dorsal ruff or spine*. Larvæ unknown. Genotype.—*Drepanosticta carmichaeli* (Laid.)

*Distribution*.—N. E. India, Burma, Indo-China, Malaya to New Guinea. The habits of species of the genus are unknown save for *D. carmichaeli* which resemble those of *Protosticta*. Dark shaded retreats are the localities in which to seek these insects, where clinging to ferns, etc. they may be beaten up and

driven into the open. Four or five species are known from within Indian limits, one of which is from Bengal, two or possibly three from Burma and a fifth from the Andamans.

Key to species of genus *Drepanosticta*.

- |   |   |  |                                   |
|---|---|--|-----------------------------------|
| 1 | { | Length of abdomen twice that of hindwing ...   | <i>D. viridis</i> Fras.           |
|   |   | Length of abdomen considerably less than twice that of hindwing ...                                      | 2.                                |
| 2 | { | Species coloured black marked with white and pale blue ...   | 3.                                |
|   |   | Species coloured reddish brown marked with blue ...  | 4.                                |
| 3 | { | Pterostigma slightly longer than broad; thorax with ill-defined blue stripes, blackish brown beneath ... | <i>D. carmichaeli</i> Laid.       |
|   |   | Pterostigma squared; thorax with well-defined blue stripes, beneath pale yellow...                       | <i>D. polychromatica</i> sp. nov. |
| 4 | { | Anal appendages complex, furnished with spines ...   | <i>D. quadrata</i> Selys.         |
|   |   | Anal appendages simple, without any spines ...   | <i>D. annandalei</i> Fras.        |

*Drepanosticta carmichaeli* Laid.

*Protosticta carmichaeli* Laid. Rec. Ind. Mus. vol. xi, p. 390, fig. 1 (1915).

*Drepanosticta carmichaeli* Laid. *ibid.* vol. xiii. pp. 341, 342, pl. xv. fig. 5 (1917); Id. Journ. Malay branch Roy. Asia. Soc. vol. ii, pp. 304-306 (1924).

Male. Abdomen 36-37 mm. Hindwing 23-24 mm.

Head.—Labium brown; labrum turquoise blue narrowly bordered with dark brown; genae, bases of mandibles and anteclypeus turquoise blue; postclypeus, frons and vertex as far back as the level of posterior ocelli blackish brown, behind which an irregular broad band of pale blue extending from eye to eye; occiput behind black, presenting a vestigial ridge behind as seen in *Platysticta*; 2nd joint of antennæ pale blue; eyes blue above, paler below and marked with a dark equatorial band of grey.

Prothorax with anterior lobe projecting forward collar like; posterior lobe simple rounded; middorsum olivaceous, the rounded bosses on each side of middle lobe azure blue; posterior lobe reddish ochreous, blue at either side; middle lobe dark chocolate brown on each side and beneath.

Thorax olivaceous on dorsum changing to golden brown laterally and then dark chocolate brown ventrad and beneath. An ill-defined pale blue antehumeral stripe on each side of dorsum confluent with the blue on posterior lobe of prothorax; laterally a broad, slightly oblique pale blue stripe traversing the whole length of mesepimeron.

Legs pale ochreous, hind femora with a small distal point of black on extensor surface.

Wings palely enfumed, hyaline; pterostigma rather longer than broad, costal side slightly shorter than posterior, proximal side very oblique, distal side slightly convex, covering 1 cell, unbraced, brown framed finely in creamy white and thick black nervures; 15-16 postnodal nervures in forewings, 14 in the hind; *Riv+v* arising distad the oblique nervure descending from the subnode; *ac*, midway between the two antenodal nervures or nearer the distal one; *ab* arising from the posterior border of wing well distad of *ac*, very oblique, meeting the discoidal cell near its proximal end, hardly longer than *ac*; *Cu*ii 8-9 cells long in forewings, 12 in the hind.

Abdomen dark golden brown deepening to blackish brown at apical ends of segments and on the whole of segments 7 to 10; segment 1 with an apical blue annule; 2 with the middorsum narrowly turquoise blue from base nearly to apex; segments 3 to 7 with bright blue basal cordate spots; 8, 9 and 10 pale-azure blue on dorsum, the lower parts of sides, especially of 10, black.

Anal appendages blackish brown, apices of superiors paler brown. Superiors broad at base, then tapering strongly till about the middle, the apical half

expanded and curved strongly downward; apex falcate; a very obtuse spine on dorsum at the site of angulation; equal to more than twice the length of segment 10; inferiors equal in length to superiors, very broad at base, then tapered, cylindrical and ending in a fine point which is curved inward; a large robust acutely pointed spine situated at the base, directed inward and upward.

Female. Abdomen 34 mm. Hindwing 23 mm.

Almost exactly similar to the male but the abdomen shorter and stouter. Segments 8 and 10 unmarked with blue; basal blue spots on segments 4 to 6 larger and more conspicuous; wings similar to those of male but *Riv+v* arising rather more distad the subnode; 16 postnodal nervures to forewings, 15 in the hind. Anal appendages short conical pointed, brown; vulvars scales robust but not extending beyond end of abdomen.

*Distribution*.—Sikkim, Kalimpong, 4,000 ft., Pashoke 3,000 ft., from April to July, in similar situations to those frequented by *Protosticta*. The beautiful colour complex of this insect will serve to distinguish it from all others of the genus save its near relative *D. polychromatica* from which it is distinguished by its larger size, different character of the thoracic markings, different shape of pterostigma, distal origin of *Riv+v* and longer *Cuii*.

***Drepanosticta polychromatica* sp. nov.**

Male. Abdomen 32 mm. Hindwing 21 mm. (Female unknown.)

Head.—Labium pale brown; labrum, genae, bases of mandibles and anteclypeus palest blue, the former narrowly bordered with brown; rest of head blackish brown as far back as the level of posterior ocelli, at which point is a moderately broad blue transverse band which falls well short of the eyes save for a minute point anteriorly.

Prothorax with dorsum chocolate brown, laterally blackish brown marked on the centre of middle lobe with a narrow yellow line, and on the sides by a broad band of blue extending from anterior to posterior lobe, the latter ochreous on the middorsum and shaped as in *D. carmichaeli*.

Thorax black on dorsum, dark chocolate brown laterally, the former marked with a well-defined narrow blue antehumeral stripe, broad anteriorly where it is confluent with the blue on prothorax, narrowing and tapering to a fine point near the antealar sinus posteriorly. Laterally a sharply-defined oblique moderately broad blue stripe lying just anterior to the posterolateral suture, followed by an equally broad stripe of the ground colour; lower part of metepimeron and beneath thorax pale yellow.

Legs pale ochreous, unmarked. Wings hyaline, palely enfumed; pterostigma almost quadrate, costal side only a shade shorter than posterior, the proximal side but slightly oblique, dark brown finely framed in creamy white and thick black nervures; 15 postnodal nervures to forewings, 14 in the hind; *Riv+v* arising in continuation of the oblique nervure descending from the subnode; *Cuii* only 7 cells long in forewings, 10 in the hind; *ac* lying midway between the two antenodal nervures; *ab* arising from *ac* or more usually from the posterior margin of wing a little distad of *ac* and longer and more oblique than in *D. carmichaeli*.

Abdomen yellow at the sides and beneath, enfumed on dorsum and deepening to blackish brown at apical ends of segments 3 to 6 to form rather sharply defined apical annules; segment 2 with a narrow middorsal streak of blue not quite extending to apical border; segment 3 with a pale blue dorsal basal spot, segments 6 to 7 with narrow pale blue complete basal annules; dorsum and sides of segments 8 and 9 broadly pale azure blue; segment 10 black, unmarked.

Anal appendages black, paler at apices, shaped similarly to those of *D. carmichaeli* but the inferiors stouter and the basal spine less pronounced.

*Distribution*.—Darjeeling district, Gopaldhara, May to July. Type in the author's collection. Distinguished from all other species of the genus by its colouring and from *D. carmichaeli* by the points enumerated under the description of that species. The sharply defined blue and dark brown stripes on the sides form the best medium for separating these two closely-allied species but in addition it is to be noted that whilst the thorax of *D. carmichaeli* is lighter than that of *D. polychromatica*, the abdomen is strikingly darker; the 10th abdominal segment is blue in the former, unmarked in the latter.



**Drepanosticta Viridis** Fraser.

*Drepanosticta viridis* Fras. Mem. Pusa, Dept. Agric. Ind. (Ent.) vol. vii. No. 7. pp. 39, 40 (1922).

Male. Abdomen 50 mm. Hindwing 25 mm.

Head.—Labium palest brown; labrum, bases of mandibles and anteclypeus palest blue, the former bordered narrowly with glossy black; postclypeus glossy black, rest of head steely blue black; eyes pale yellow, capped above with puce; occiput ridged behind as in *Platysticta*.

Prothorax dirty yellow; posterior lobe dark bronzed brown, broadly arched, simple; anterior lobe collar-like.

Thorax dark metallic green or blue on dorsum changing to reddish brown at humeral region and pale brownish yellow laterally. Lateral sutures mapped out obscurely in pale brown, the anterior suture bordered broadly and diffusely with black. Beneath yellow.

Legs yellow with black spines; extensor surfaces of femora blackish brown, tibiae olivaceous.

Wings hyaline; pterostigma reddish brown, very small almost quadrate, costal border but slightly shorter than posterior, distal border convex, proximal but slightly oblique; 14 to 15 postnodal nervures to forewings, 14 in the hind; *ac* lying much nearer the level of distal antenodal nervure; *ab* arising from posterior margin of wing well distad of *ac*, very short, hardly longer than *ac*; *Riv* + *v* arising well distad of the oblique nervure descending from the subnode.

Abdomen of great length, very slim, resembling species of *Protosticta* more closely than any other species of the genus. Segments 1 to 7 brownish black, this colour deepening at apices of segments 2 to 7 but falling short of bases of segments where are seen narrow white basal annules; segment 8 with the basal half azure blue on dorsum, black laterally and middorsally so that the blue of apex presents two points directed basad subdorsally; segment 9 entirely pale azure blue on dorsum, segment 10 black, emarginate and with a deep depression on dorsum extending nearly as far as its base.

Anal appendages black; superiors twice the length of segment 10, bent at a right angle at their middle, downwards and a little inwards, broad at base, presenting a needle-like dorsal spine at the point of angulation; apex expanded, bevelled at end. Inferiors nearly as long as superiors, broad at base, then flattened, twisted spirally on their long axis at the middle of appendages, apical half angulated sharply upwards to meet and overlap apices of superiors; a small needle-like spine on the inner border, directed inwards near the middle of appendages.

Female. Abdomen 37 mm. Hindwing 25 mm.

Closely similar to the male in colour and markings but shorter and more robustly built. Segments 8 and 9 without blue markings; segments 1 to 6 with well-defined basal white annules, 7 without, otherwise all details, including venational ones similar to those of male.

*Distribution*.—King Island, Mergui, Lower Burma. Found beside marshes and small irrigation channels and streams in rubber plantations. Distinguished from all other species of the genus by the extreme length and attenuation of its abdomen which is exactly double the length of the wings as in species of *Protosticta*. The armature of the anal appendages recalls that of *P. himalaica*.

**Drepanosticta Quadrata** (Selys.).

*Platysticta quadrata*. Selys, Bull. Acad. Belg. (2) x. p. 441 (1860); Id. Syn. Agr. Derniere Legion. sep. p. 13 (1860); Id. Ann. Mus. Civ. Giv. Genov. (2) x. xxxii. pp. 507, 508 (1891); Kirby, Cat. Odon. p. 133 (1890); Laid. Fascic. Malay. Zool. Pt. iv. p. 11. fig. 1 (1907).

*Drepanosticta quadrata*. Laid. Rec. Ind. Mus. vol. xiii. p. 343 (1917); Id. Journ. Malay. Roy. Asia. Soc. vol. ii. pp. 304-306 (1924).

Male. Abdomen 35 mm. Hindwing 21 mm.

Head.—Labrum, bases of mandibles and anteclypeus palest blue, the former broadly bordered with glossy black; postclypeus and rest of head black.

Prothorax creamy white; posterior lobe black, simple.

Thorax bronzed black on dorsum, pale bluish laterally, pale yellow beneath. Laterally an oblique black stripe traversing the length of mesepimeron.

Legs pale, the extensor surfaces of femora and articulations black.

Wings hyaline; pterostigma subquadrate, black, finely framed in white and thick black nervures; *Riv+v* arising slightly distad the oblique nervure descending from the subnode; 11-12 postnodal nervures in forewings, 10-11 in the hind.

Abdomen blackish brown, segments 2 to 7 with a narrow yellow basal annule, the black expanding at apical ends of each segment to form broad apical annules; segment 8 with the apical half and 9 with the whole of dorsum pale blue; segment 10 black.

Anal appendages black, superiors twice as long as segment 10, slightly curved towards each other and downwards, a robust spine on the upper border of middle of appendage, apex slightly flattened and dilated. Inferior appendages of similar length, pale at base which is broad and presents an inner upper obtuse spine or tubercle, then tapering, subcylindrical, apex curved in, notched and preceded by a long inner spine.

Female. Abdomen 31 mm. Hindwing 18 mm.

Head.—Labrum dirty white; anteclypeus pale yellow; postclypeus and front of frons traversed by an obscure band; rest of head black.

Prothorax pale yellow; posterior lobe emarginate at middle, yellow with obscure greyish fascia.

Thorax bronzed black on dorsum as far lateral as the antero-lateral suture, the middorsum greyish yellow. Laterally and beneath pale yellow with a broad oblique brown stripe traversing the mesepimeron. Legs pale yellow, articulations obscure.

Wings similar to the male but *Riv+v* arising in continuation with the oblique nervure descending from the subnode.

Abdomen brownish black, segments 2 to 7 marked similarly to the male; segment 9 yellow on dorsum, 10 black.

Anal appendages short, conical, black. Vulvar scale robust.

*Distribution*.—The type comes from Singapore but it is by no means certain that the allotype female from Burma (Teneral and in poor condition) belongs to it, the probability being otherwise. The female, taken on Mt. Karen in May, has the paler yellow markings probably pale blue in the adult stage.

#### **Drepanosticta Annandalei** Fraser.

*Drepanosticta annandalei* Fras. Rec. Ind. Mus. Vol. xxvi. pp. 412, 413 (1924).

Male. Abdomen 32 mm. Hindwing 22 mm.

Head.—Labium brown; labrum, bases of mandibles and adjacent part of anteclypeus palest blue, the former narrowly bordered with glossy black; postclypeus and rest of head matt black; basal and 2nd segments of antennæ white; eyes olivaceous brown above, paler beneath.

Prothorax brownish white with a large black spot on each side; posterior lobe simple, rounded.

Thorax blackish brown on dorsum with the middorsal carina and upper part of humeral suture paler. Laterally white with a diffuse brown fascia traversing the sides obliquely as far as metepimeron.

Legs creamy white; femora on extensor surfaces stippled with black; tibio-femoral joints black.

Wings hyaline; pterostigma blackish brown, shaped similarly to that of *D. carmichaeli*; 16 postnodal nervures to forewings, 14 in the hind; *Riv+v* arising in continuation with the oblique nervure descending from the subnode; *ab* very oblique, arising from posterior border of wing somewhat distad of *ac*.

Abdomen creamy white laterally and beneath, black on dorsum, the black not extending to extreme base of segments but expanding apicad to form broad annules; segment 8 white or pale blue for its basal two thirds but the black of the apical third extending finely along the middorsal carina as far as base of segment; segments 9 and 10 black, unmarked with blue.

Anal appendages black, slightly longer than segment 10, the inferiors slightly shorter than superiors. Superiors broad at base, rotated on their long axis at the middle at which point they curve somewhat inwards and strongly

downwards ; apices obtuse and slightly bevelled. Inferiors broad at base, then tapering, cylindrical, ending in an acute point.

Female. Abdomen 25 mm. Hindwing 20 mm.

Very similar to the male but abdominal segment 8 black for its apical half ; segment 9 with the basal two-thirds white (or blue) apical third black. Anal appendages short, conical, pointed, pale ; vulvar scale robust, not extending beyond end of abdomen.

*Distribution*.—Andamans only. Type in the Indian Museum from Mt. Harriet, 800 ft. South Andamans, taken in deep jungle at edge of a stream in December. Its simple black colour with white and blue markings serves to determine it from *D. carmichaeli* and *D. polychromatica* whilst the comparatively short abdomen will separate it from *D. viridis*. Its extremely simple anal appendages will distinguish it from *D. quadrata* as well as from other Malayan species of the genus.

In the original description I compared this species with *D. hilaris* from Burma, whereas *D. quadrata* was of course intended.

(To be continued.)